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ABSTRACT

The paper reviews 16 studies on the effectiveness of active early intervention for Down's Syndrome children. An introductory chapter explains the nature and etiology of Down's Syndrome and reviews terms such as development and intervention. Chapter 2 analyzes studies in terms of influence of various types of intervention on developmental outcome in motor, cognitive, and overall functioning. Chapter 3 deals with the interplay of such variables as parent involvement and age of Down's Syndrome child at intervention. A final chapter cites methodological limitations of the studies yet concludes that the majority of studies found that early intervention was effective. (CL)

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A Research Paper
Presented to the
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Education of Queens College

In Partial Fulfillment
for the Degree of Master
of Science in Early
Childhood Education

by

Maryann Ferrigno Combs
May 10, 1984

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Early Active Intervention
Upon Areas of Development
in the Down's Syndrome Child

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During the summer of 1973 a group of young and older adults worked as counselors for the project "Operation Fun." This was a summer camp program for mentally and physically handicapped children as well as a number of adults. Counselors had responsibility for one or two individuals for the entire course of the day. While the child assigned to a particular 15 year old counselor was one of the mildly handicapped citizens there were those who made a deep and outstanding impression on the young adult day after day. This group of citizens were referred to as "mongoloids" and ranged in age from toddler to 30-40 year old adult.

Little was known to her about what made this certain group of individuals so unique and yet so similar. The 30-40 year old adults seemed as warm, childlike and innocent as the toddlers and young children. Many of their physical features and expressions were so identical it made one question the thought of their relationship being brothers and sisters. The young counselor retained all these interesting facts and unanswered questions in her mind for the upcoming years. Occasionally this information would be recalled and discussed, new information would be added to the existing, but personal open-ended questions still remained stored deeply away.

However, a day finally came when the bits and pieces of information, as well as the open-ended questions became real

and much clearer to the author. A young couple in their early 30's, friends and co-worker of the author and her husband were expecting their first child. She being a registered nurse and clinical specialist and he an accountant as well as teacher on the college level one could assume they are both well educated and intelligent people. As they awaited the arrival of their first new child friends and family alike were both anxious and excited. What are the thoughts and feelings then when it is announced that a baby girl with Down's Syndrome has been born? Shock, disbelief, grief, hurt and fear are all a part of those first feelings and thoughts when one is told. This young couple now not only had to deal with the addition of a new person in their lives, but a person who would be needing and living a life much different than the one they expected. So many questions go through ones mind when an occurrence such as this happens to those so close to home. Where does one begin in sorting out the pieces and steps to take in dealing with the life of a child such as this?

The young couple thought and discussed this coldly factualized statement for days and nights on end. There was much to be considered when reflecting on the future development and life of this child. There was a need now for work, time, effort and love beyond and above what one could imagine. A family then was contacted to adopt this baby whom the couple thought would benefit the situation all around.

However, when our heart and mind are in conflict the heart sometimes becomes the one to pave the way. At the last moment

these two individuals realized they wanted to be the parents of this special child and would not be alone in doing so. They have started from that moment on to satisfy their hunger and thirst on learning about Down's Syndrome and how they can help their new child. What strong and loving people those must be to continue with the matters of daily living as well as carrying the responsibilities of "a special package." This special child is now exposed to and involved with as many activities and experiences that will help her to become a functioning human being, developing to her utmost potential. As this young couples' life has taken on new meaning so has the life and direction of this new individual. Through the hope and intervention of family and friends her life will become as enriched and stimulating as her experiences; not because she is handicapped, but because she is a child with potential.

In his book, Children of Dreams, Children of Hope, Raymundo Veras stated the emphasis of these thoughts so wonderfully. "Without the input of information a computer is nothing more than a useless piece of machinery.

Without the input of information, a child is nothing but a living, breathing organism.

Unless a computer is programmed and in good running order, it cannot be expected to function at its fullest potential.

Unless a child is programmed and in good running order, he cannot be expected to function at its fullest potential.

If we do not respect the potential of a computer, then it is likely not to be properly programmed.

If we do not respect the potential of a child, he is not likely to be properly programmed."

If we do not love our children and do not show them our love, then they become less than they might have been. Then we become less than we might have been." (40:111-112)

To most parents forced with a blow similar to the one of this young couple, a number of factors hinder the provision of optional conditions for their child. These include common prejudices associated with Down's rather ill chosen non-medical nickname (mongolism), unjustified feelings of guilt and responsibility associated with inadequate knowledge of the etiology; fears of financial burden of a handicapped child; and a total lack of any idea of where to start in acquiring and learning about help for their child. "All these tend to lead to a degree of neglect of a child who is often its own worst enemy in being a very quiet and undemanding infant." (3:74) According to Santostefano, (24:732) children with Down's Syndrome are often placid and undemanding so that they receive little specific training and attention in their early life. In the past years many have been left lying on their backs to stare at a blank ceiling, a process hardly conducive to the mental development of even a normal baby. The normal baby, however, protests against neglect or lack of stimulation, and is not likely to be ignored. In the case of the Down's Syndrome child a subtle psychological rejection may take place where the mother unconsciously avoids contact with her child. In a sense, the parent is going through a stage somewhat analagous to bereavement, where the parent has "lost" the child he expected to have.

These reactions, however, are perfectly natural and

predictable according to Brinkworth to an event that was most likely not anticipated and holds a future filled with difficulties, problems and hard work. He continues to emphasize that if these natural reactions are not responded to with psychological support and practical guidance for the parents, an additional handicap is likely to be added to the inevitable ones associated with Down's Syndrome itself. As Brinkworth states so clearly "While some degree of handicap is inevitable, as is the primary result of the condition and involves prenatal events beyond our control it appears certain that this has in the past, been exacerbated by an unhelpful postnatal environment which, interacting with an underdeveloped organism with numerous developmental anomalies in both structure and function, fails to provide the exceptionally high levels of stimulation and interpersonal contact required by such a child. For too long there has been a tendency to regard mental handicap as something static and irrevocable. Life and development are dynamic and as long as life exists, it is inseparably associated with change." (3:77)

Statement of Problem:

Do children born with Down's Syndrome who receive early active intervention attain a higher level of development than those who do not? As parents, physicians and researchers the author has observed and noted differences in children with Down's Syndrome receiving some type of intervention. This knowledge has been attained not only through personal contact with these individuals and their families, but through numerous

amounts of literary and scientific sources as well. While the Down's Syndrome child has difficulty in his/her earliest years profitting from the environment due to muscular, language and intellectual limitations these children do pass through the same stages of development as other children, only at a slower pace.

During the early years of life then, from birth to five years is a child's most active period of growth for physical and intellectual development. Thus, the earlier a child receives progressive stimulation the more rapidly he/she advances.

As stated by Dr. Hayden in an article published in Family Circle, "A decade ago, it was assumed at birth that Down's Syndrome kids were severely retarded and ineducable. Now we are challenging some persistent myths about mentally handicapped children and demonstrating that much can be done to accelerate their development. It has been tremendously rewarding to see these children achieve beyond the fondest expectations of families and educators and far ahead of those "without" early intervention." (41:52)

There are indications then from several different origins that Down's Syndrome children have potential for learning more than they had 20 years ago. However, there is always the underlying question as to the reason for the increased activity providing educational opportunities for Down's Syndrome children. A hint at an explanation may be found in a paper presented by Thorley at the World Congress on Future Special Education. (27) In the paper she proceeds to comment on an article written by

John Thorne in December, 1977, wherein he comments on research done long ago. This has to do with a 1939 study by Skeels and Dye (26:114-136) where they reported that two retarded infants, ages 13 and 16 months, had, six months after being transferred from a state orphanage to a state institution for the retarded registered remarkable gains. The younger infants IQ had shot up from 35 to 87. It turned out that the infants had been virtually adopted by adult female residents of the institutions, ages 18 to 50, who, of course, were retarded themselves.

Thorne's work continues to develop the educational methods of teaching through training to differentiate between the traditional goal of merely training the retarded up to their retarded potentialities but rather takes the point that they may be training them to be less retarded as the ultimate goal. Dr. Alice Hayden, Director of the Model Preschool for Handicapped Children at the University of Washington has commented in her works that the major objective in all classes is to make childrens' development more nearly approximate sequential development of normal children. (36) It seems then, as Thorley states that in the article written by Thorne on the two infant Down's Syndrome babies being cared for by adult retarded women that there the seed for the idea for early infant stimulation was probably planted.

Definitions:

For the purpose of this study the major terms will be defined according to the following. The Encyclopedia and Dictionary of Medicine and Nursing and the Dictionary of Medical

Syndromes refers to Down's Syndrome as such: - a congenital defect caused by a chromosomal abnormality and characterized by physical malformations and some degree of mental retardation. The disorder is also known as mongoloidism because the patients facial characteristics resemble those of persons of the mongolian race. It occurs approximately in one out of every 600 births and is not limited to race, nationality or class. Down's Syndrome is also referred to as trisomy 21 because the disorder is concerned with a defect in the 21st chromosome. The term trisomy refers to the presence of three representative chromosomes in a cell instead of the usual pair. The 21st chromosome pair fails to separate when the germ cell (usually the ovum) is being formed. Thus, the ovum contains 24 chromosomes and when it is fertilized by a normal sperm carrying 23 chromosomes the child is born with an extra chromosome (or a total of 47) per cell. Trisomy 21 occurs in 95% of the cases of Down's Syndrome. Another case of Down's Syndrome is the translocation type which involves a union between a chromosome 21 and a chromosome of the 13-15 group. Translocation types constitute less than 1% of all cases. The remaining 1% of Down's Syndrome cases are found to be mosaic. Some cells are trisomy 21, whereas others are of normal Karyotype. Mosaic Down's Syndrome originates in an accident at an early cleavage stage.

While the causes of Down's Syndrome are not yet known there is a relation between incidence and maternal age: 25 year old, 1:2000 births; 35 yr. old, 1:200 births; 40 or older 1:40 or higher. However, women between the ages of 26-34 bear

approximately 80% of the children born with Down's Syndrome. Although all of the physical characteristics of Down's Syndrome are not found in a child suffering from the disorder, there usually is a combination of several of them so that diagnosis can be made without difficulty at birth. These characteristics include: a small flattened skull, short flat bridged nose, wide set eyes, epicanthic skin folds, iris usually blue or grey with Brushfields' spots, a protruding tongue that is furrowed and lacks a central fissure, short broad hands and feet with a widened gap between first and second digits and a little finger that curves inward. The muscles are hypotonic and there is excessive mobility of the joints. The genitalia are often underdeveloped and congenital heart defects are not uncommon in many cases. As the child grows older he remains below average in height and has a tendency to be overweight. There is no cure for Down's Syndrome. However, most individuals with Down's Syndrome are educable and can be helped to live productively. (33:287-88), (30:233)

While Random House Dictionary defines "early" as: in or during the first part of a period of time, a course of action, a series of events, etc., we will use Funk & Wagnalls' definition of "early" as: at or near the beginning of a period of time, being or occurring sooner than is usual or necessary. (38:448), (34:396)

The term "active" is defined as: characterized by action, not passive, not expectant in Dorlands' Medical Dictionary. (32:28) However, the author will define "active" according to the McGraw Hill Nursing Dictionary as: energetic, decisive, as

active treatment: causing or producing change, performed by the patient. (37:17)

For the term "intervention" Stedman's Medical Dictionary defines it as such: a generic term designating what is done vis a vis the patient (39:717) while Funk & Wagnall define it as the act of intervening or coming between. (34:666) However, for the purpose of this study the author will use the definition of "intervention" stated in the Dictionary of Education; any action on the part of an organism that serves to change the relative position of the objects or forces of the environment and of the organism itself, thus bringing new stimuli to bear upon the organism. (29:314)

The last major term to be defined "development" is stated as the act or process of natural progression from a previous stage to a later more complex stage in Stedman's Medical Dictionary. (39:383) For the purpose of this study though we will use the definition of "development" as stated by Dr. Miller and Carter Good: a gradual growth, change or expansion in structure function, or organization especially from a lower to higher stage of complexity, constituting an advance in size, differentiation, complexity, integration, capacity efficiency, or degree of maturity; loosely used as synonymous with growth, but more often and correctly restricted to sequences involving qualitative changes or changes in quantitative relations among constituent elements or factors, whether with or without merely incremental growth. (33:265), (29:175-176)

Hypothesis:

Through analysis and comparison of studies the author states that there will be a significant difference between the groups with and without intervention. This can be stated as such: Children who are born with Down's Syndrome who receive early active intervention will attain a higher level of development than those who do not receive any type of intervention at all.

Assumptions:

In order to establish and understand a clearer relationship between intervention and a higher level of development the researcher assumes the following: 1) That there is existing research available on children with Down's Syndrome 2) There are a number and variety of intervention programs 3) There are children with Down's Syndrome receiving some type of intervention 4) That children with Down's Syndrome do develop 5) That the term "development" can be measured and observed 6) That there are children receiving no type of intervention whatsoever.

Significance:

Throughout his book Dr. Veras strongly emphasizes the idea of environment and how it must be tailored to an individual child's needs. He further states that "a childs development is not necessarily a result of his genetic makeup or his abilities and talents. In most cases it is a reflection of the quality of his environment." (40:111) An excellent environment then is one that provides children with magnificent opportunities to see, hear, smell, feel and taste things that regular children see, hear, smell, feel and taste.

What better reason then to provide these children with numerous and varied experiences in the areas of visual, motor, auditory, tactile and language development. By creating an environment filled with diversified experiences and levels of stimulation the child will be working towards and strengthening his level of potential to the utmost. The problem of intervention then and the significant difference it can make in the lives of children with Down's Syndrome who are receiving it is quite important.

This point can be based on a main theory of education, "A child learns through experiences." The more opportunities a child is given to interact and manipulate with people and objects in the environment the more knowledgeable he will become. While the experiences may not always be pleasant or positive for the child this will enable him to become more aware of distinguishing and responding to those experiences which are good and satisfying. Whatever realm of development or area the experience may be geared toward a programmed type of intervention will surely incorporate and provide the child with numerous amounts of activities and ideas to be learned. Lastly, while intervention practices depend a great deal upon input from parents this places them in a good position to arrange experiences for their children, thus shaping child behavior. As stated by Maya Pines in her article in Psychology Today, "The key to the children's development is how much verbal stimulation and encouragement they receive, as well as their opportunities for achieving mastery of skills." (44:50)

While the problem in question may be based on a theory of education it also has universal ramifications for the disciplines of medicine, sociology, psychology and the natural sciences. Although years of study and schooling are necessary for those in the medical profession the actual application of this knowledge comes about with first hand experiences. Correctly diagnosing symptoms and ailments of actual patients is usually more complicated and perplexing than what the textbooks portray. Performing various procedures and prescribing certain modes of treatment for patients is strengthened by the number of experiences one is encompassed by. The results of these experiences which may sometimes prove to be negative (incorrect) are still learning trials for the physician who is continuously comparing, interpreting and applying one experience to the other.

As the child learns through organized approaches of intervention the surgeon for example employs intricate techniques for a specific type of surgery that has proved successful for a number of other cases performed previously. The surgeon, too, must follow a plan of action progressing from one step to the next, learning about the condition of the patient along the way. Each step then is like a small piece of the entire experience which will hopefully be directed toward completion of a successful operation and a more knowledgeable doctor.

The discipline of sociology is involved with the study of human society and social behavior. We are encouraged to focus on features of our environment that we haven't noticed before and to interpret them in a new and richer light. Through

our past, personal experiences we shape our own view of the world. Those experiences which have made an impression upon us in some type of way, positive or negative, may be either incorporated or disregarded from modes of behavior.

The culture that is shared in this society consists of a multitude of various experiences dealing with religion, myths, ideas, customs, beliefs, language, family patterns, rules, etc. Those learned ways of life which are accepted, modified and passed on from one generation to the next is what becomes a family's or certain group's "culture." These relationships and interactions with people are experiences by which many of our values, norms, attitudes and morals are determined. Thus, the greater amount of experiences people are exposed to, the more varied and numerous amount of behaviors may be incorporated as our own.

When discussing the realm of psychology B.F. Skinner described human behavior as being shaped by experiences of reinforcement. He continued to state that behavior which is reinforced will be strengthened and that which is not will tend to disappear. He also pointed out that parents should be systematic in providing reinforcement, first by selecting the desired behavior and then by taking steps to strengthen it. As one gets older the same principle seems to apply in many situations. Those instances which tend to provide pleasurable and satisfying responses are those which shape our behavior and focus it towards that direction. Those behaviors which do not provide experiences of positive reinforcement are those

which people tend to engage less in or totally disregard as a repertoire of their own behavior.

Millard and Bandura also emphasize that behavior is shaped by experiences which provide exposure to models and imitative behavior. To increase behavior with desirable characteristics parents need to expose their children to positive modeling and imitative situations, as well as limit the number of experiences which will result in undesirable ways.

Lastly, when considering the natural sciences which study physical and biological phenomena the same principle may be applied.

New findings in research and experimentation are derived from experiences that the scientist must repeat over again to determine the cause of an event. What happens as a result of these experiences, experiment, measurement or observation helps the scientist to discover more exactly how it works and also what range of facts and events are related to it. Scientific progress then, is made by building on information already acquired and theories already proven by earlier investigators and/or experiences.

Delimitation of Scope:

This study will deal with children diagnosed as having Down's Syndrome. In a few of the experiments a group of normal children were used for means of comparison. Subjects employed having Down's Syndrome ranged in age from birth to 6.3 years. In one large scale study the subjects' age range was up to 15 years old. The age range of the normal group of subjects

was 3 to 9 months. Both sexes, male and female are represented throughout the study. Children were either reared at home or in some type of center. Intervention was carried out either at a clinic, home and/or both.

In addition to normal children being employed as subjects a number of the studies were assisted by parents. (maternal figure) Throughout each individual study the arrangement and comparisons of a treatment group and control group are also included. Lastly, the means of intervention consisted of emphasis in the areas of motor, sensory, auditory, social and language development, mental functioning, self-help skills, muscle strengthening and play activities. Some studies also focused on the increased effectiveness of parents as trainers and the age of the subject when beginning an intervention program.

Chapter II: Analyses

Influence of Various Types of Intervention Upon Developmental Outcome:

To support the hypothesis that children with Down's Syndrome who receive early active intervention attain a higher level of development than those who do not, 16 empirical studies were compared and evaluated. The following chapter will proceed to make reference to the type of intervention employed in each study and its relation to the results. As a means for stimulation various types and degrees of intervention were used. The intervention focused on the areas of: Language Development, Motor Skills and Sensory Integration, Mental Functioning and overall Developmental Milestones. All studies except one confirmed the means of intervention, no matter what the type or area it focused on in revealing positive and significant differences for those children receiving it.

In a study conducted by Mac Donald, Blatt and Gordon (17:395-415) six preschool children ranging in age from 3 to 5 years old were employed as subjects. The program applied the Environmental Language Inventory Strategy to effect a generalized functional language in children who were primarily capable of only single word utterances. The main objective was to increase utterance length and semantic grammatical rules use. The experimental group participated in two phases of training including sessions two times a week at the clinic with trainer and the mother (two months) and at home with mother as the sole language trainer (three months). After five months experimental

subjects made substantially greater changes in MLU (mean length utterances) than did the control subjects in imitation, conversation and play. In addition, follow up assessment indicated continued language increment for the experimental subjects over three months of the home program.

Another study done by Salzberg and Villani (23:403-13) also revealed positive results in the area of language development. Using a baseline design two Down Syndrome males both 3.5 years of age were studied as well as their mothers. Two settings were employed in this study as well, an experimental preschool and the home. Sessions in the preschool were held three or four times a week for 5 to 20 minutes. Twenty vocal imitation trials made up each tape recorded session (four responses presented five times in random order). Home sessions were 15 minutes each on days when training was not conducted at school. Intervention focused on correct vocal imitations, a change in appropriate child behavior and an increase in spontaneous vocalization.

Baseline observations were collected in both the preschool and at home. In the school setting results indicated an increase in vocal imitation and decrease in appropriate behavior of children. After generalization training positive results were also evident during free play at home. There was an increase in vocal prompting and praise at home by the parents with a concomitant improvement in childrens' imitation and spontaneous vocalization.

Lastly, in an experiment done by Bidder, Byrant and Gray (2:383-6) the children in the treatment group showed clear gains

especially in the area of language after 6 months of intervention. These children, two girls and six boys, 12 to 33 months old were trained at home in both verbal comprehension and verbal expression, as well as manipulative activities and self-help skills for six months. The children in the treatment group had advanced at the mean rate 6.56 months, range 3-13 months, whereas the control group had only advanced at the mean rate of 2.56 months, range 1-5 months, on the language scale. This analysis shows a highly significant difference in the area of language development ($P < 0.01$) for those children receiving intervention.

"As evidenced by a number of recent studies infants and very young children having Down's Syndrome are generally more deficient in motor skills than in cognitive skills." (11:339) To assess the effect of neurodevelopmental therapy on the motor performance of infants with Down's Syndrome a study was conducted by Harris (10:477-83) with 20 Down's Syndrome infants, (11 female, 9 male, ranging in age from 2.7 to 21.5 months). After random assignment to the experimental and control groups, the intervention phase of the study began. Therapy sessions, lasting 40 minutes each, were carried out in the home three times weekly for each subject in the experimental group over a nine week period. While four individual therapy objectives were written for each infant in the study there were also three common goals for all subjects receiving therapy. These were: facilitation of normal postural tone; facilitation of righting, equilibrium and protective responses; and enhancement of normal patterns of movement. All children were pre and posttested on the Bayley and the Peabody scales by a registered physical therapist.

A significant between-group difference in favor of the experimental group ($P < .05$) was demonstrated in evaluating the attainment of the individualized therapy objectives. The experimental group achieved 80 percent of their individualized objectives, whereas the control group achieved 57.5 percent of their therapy goals. The small sample size, the lack of activities on the test which would serve as objectives of neurodevelopmental therapy and the brief length of the intervention period lend suggestion to the failure to find significant between-group differences on either the Bayley or the Peabody scales.

According to Kanter and Clark (14:414-420) the child with developmental delay experiences a degree of deprivation because of slow maturation coupled with inadequate responses of sensory and motor systems to environmental stimuli. To determine the effects of specific vestibular stimulation on motor performance two Down's Syndrome and one normal child, 6 to 24 months of age, were exposed to ten days of vestibular stimulation. The other four children (control group) were used to determine the effects of two weeks of regular maturation on motor performance.

Each child in the treatment group was exposed to two stimulus treatments clockwise and also counterclockwise. In addition, the two pairs of vertical semicircular canals of each child in the treatment group were exposed to four stimulus treatments. Motor performance was examined before and after the period of stimulation using a motor skills assessment test. Results indicated that ten days of vestibular stimulation produced a marked improvement in motor performance in children with Down's

Syndrome and normal children as well. Before stimulation the Down's Syndrome children demonstrated a hyperreactive vestibular response when compared with normal children. However, treatment produced maturation of this mechanism in Down's Syndrome children to approximately match level of inhibition observed in the normal child. While control group showed change in vestibular habituation due to normal maturation, there were no differences in motor performance for them, with treatment children evidencing the greater change.

Connolly and Russell (5:156-58) also pointed out that gross motor skills such as head control, sitting and walking are attained earlier through early stimulation. Their study consisted of 40 Down Syndrome children, infants (birth to 18 months) and toddlers. (18 months to 3 years old) Since a specific control group was not available a comparison of the gross motor milestones collected and reported by Fishler and his co-workers on Down's Syndrome children not receiving intervention was made. Before the program began the child's condition was evaluated in the home setting and then resulted in a program for individualized gross motor activities, as well as activities for sensory stimulation. For one-half day for a period of ten weeks the parents and children came to the center in the fall and spring. During the summer months home programs were continued with visits by the staff of the physical therapist and nursing departments. As a result the intensive motor and sensory stimulation program accelerated the attainment of many developmental tasks. After six months of intervention the following results were displayed

in comparison to the control group:

Holds head erect - Experimental - 2.8 mo., Control - 3.5;

Rolls over - Experimental - 4.5 mo., Control - 5.7;

Sits unsupported - Experimental - 8.0 mo., Control - 11.3;

Crawling - Experimental - 8.6 mo., Control - 12.5;

Pulls to standing position - Experimental - 12.4 mo., Control - 18.4;

Stands - (at rail) - Experimental - 11.6 mo., Control 17.1.

Concurrently with a program of exercises Brinkworth (3:73-8, 82) presented his subjects, five Down Syndrome infants with a planned and comprehensive course of sensory stimulation and training. Parents and children were visited at home weekly during the first six months of life. Activities focusing on strong and vivid auditory and visual stimulation were stressed, as well as those for specific motor skills. At six months, these children were assessed on the Griffiths Scale against six control cases who had not received intervention up to ages ranging from 7 1/4 to 12 3/4 months. Results indicated substantial and significant differences in favor of the experimental group, those receiving sensory stimulation and training.

According to Anastasi, heredity factors set the extreme limits for intellectual ability while environment determines the attained level within the genetically-determined range. The application of this principal might provide a foundation on which to build a preventatively oriented intellectual development program. It appears, then, that an effective infant stimulation program, started as early as possible can provide a maximally stimulating environment. In Drash and Stolberg's study (8:2-12)

subjects included two groups of infants and their mothers. The first group was comprised of four normal children, 3 to 6 months of age. The second group of three infants was diagnosed as having Down's Syndrome and were 2 to 6 months in age. Children and parents received training on a weekly basis. The program consisted of the acquisition of expressive and receptive language skills, the shaping of appropriate motor and self-help skills and parent training in order to enhance the infant's intellectual and social growth.

Intellectual development was assessed by The Cattell Test of Infant Intelligence and the Stanford-Binet Test of Intelligence. The IQ range showed a general upward trend. IQ scores ranged from 78 to 96 with a mean of 88.8 for the Down's Syndrome group. Down's Syndrome subjects appeared to be developing at a rate far above the expectations of Down's infants. By one year subjects were two and three standard deviations above the expected mean IQ scores for their respective reference groups.

De Coriat and his co-workers (7:377) also found that there was a significant difference between the stimulated and unstimulated groups when studying the effects of psycho-motor stimulation on the IQ of children with Down's Syndrome. After a full pediatric examination each child was measured with the Gesell Scale and the assessment repeated every three to six months. An outline scheme of stimulation was produced for each child who was then left in the charge of a trained teacher. In evaluating the results the IQ's of the group of Down's Syndrome children stimulated were compared with the IQ's of a similar

group left alone to spontaneous evolution. By two years the medium IQ of the stimulated group was 82.7 compared with 66.4 in the unstimulated group. At five years they were 65.1 and 49.1 respectively. The stimulated group were also more easily integrated into kindergarten and other groups of normal children.

While some programs of intervention focus on one or two areas to specifically develop they also indirectly affect the development of other milestones. The following studies seemed to concentrate their intervention on the child's overall developmental process. Clunies-Ross (4:169-77) studied 36 Down's Syndrome children ranging in age from 3 to 37 months. The program began in 1976 with two successive annual intake groups collected and recorded for data as well. Children attended the center two or three times a week for a total of 6 hours. Home based training consisted of three 15-minute sessions with the parent and child concentrating on specific skills. Instructional time was devoted to training in six developmental areas: language, social, self-care, cognitive, fine-perceptual motor and gross motor. Within the first two weeks of being enrolled in the program and thereafter at approximately four month intervals, each child was assessed on the Early Intervention Developmental Profile (EIDP). Results demonstrated that systematic early intervention can accelerate markedly the development of Down's Syndrome infants and young children. There was a continuous improvement in the developmental status of each group of children in the three intake groups. In every individual case, continuous increments in developmental quotient occurred.

Similar results were founded by Hanson and Schwartz (9:403-07) when they studied twelve Down's Syndrome infants (4 weeks to 6 months) and their parents. The development of the subjects in the program was compared to previously established "norms" for Down's Syndrome (home-reared not involved in intervention program) and normal children. Goals for infant skill training were primarily normal developmental milestones. The training was aimed at accelerating the subjects acquisition of these developmental landmarks. Goals were established for each infant after an evaluation based upon the assessed needs of the infant and the parent's input. Four to five programs were performed each week with ten trials per day for each program. Duration of participation in the program ranged from 15 to 30 months.

Infants involved in the intervention program appeared to acquire behaviors at an earlier age than would have been expected on the basis of previous developmental data on Down's Syndrome children. Comparisons show that although infants in the intervention program achieved developmental milestones at a slightly later age than the normal children, they were consistently earlier than the Down's Syrdrome infants not involved in an intervention program.

In a large scale study by Ludlow and Allen (16:29-44) three groups of Down's Syndrome children were employed to estimate the effect of early intervention and pre-school stimulus on their development. Down's Syndrome children born between 1960 and 1969 and living in East Kent were divided into three groups. The 75 children in group A had attended a developmental clinic

for a minimum of two years before their 5th birthday. These children also received a planned program of stimulation. Group B consisted of 80 children who developed spontaneously in their own homes and the other 43 children in group C were institutionalized shortly after birth. Children in the intervention group attended a clinic for two hours twice a week with their mothers. A program of stimulation provided a positive approach and was geared to individual needs of the Down's Syndrome child. The policy was to treat these children as normally as possible and make them so socially acceptable in behavior that they could be integrated into normal play groups.

The percentage of children scoring over 50 in general quotient was highly significant for group A when compared to either Group B or C (A=47.1, B=18.7, C=10). When measuring Intelligence Quotient with the Revised Stanford Binet L-M Scale the quotients in group A were between six and twelve points higher than those in group B. It was impossible to compare children in Group C since the number who were able to score at the two year level was so limited. On the Personal Social Scale proportionally more children in Group A than in either of the other groups scored 50 or over. The figures in Speech Development also demonstrated the superiority of Group A with the Speech Quotient being 49. It was also clear that the proportion of children who were placed in ordinary, private and E.S.N. schools was much higher in Group A than in Group B both at 5 years and at the end of the survey. Overall then the early and intensive stimulation resulted in the Down's Syndrome child reaching a

higher level of attainment than his unstimulated counterpart.

Five years after the original study Connolly (6:1405:08) evaluated and studied 20 of the original 40 children studied in 1975 in terms of intellectual, social, motor, and adaptive functioning. All children had completed the early intervention program until 3 years of age. At the time of follow-up testing, these children ranged in age from 3.2 years to 6.3 years. The comparision group (53 children with Down Syndrome) was within the same age range and had not participated in an early intervention program. Subjects were tested with the Stanford-Binet, Cattell Infant Intelligence Scale and the Vineland Social Maturity Scale.

The mean IQ for the EI (Early Intervention) group was almost 12 points higher than for the comparison group, a significant difference. ($P < .005$). The EI group also significantly exceeded the comparison group by 9 points in the predicted direction ($P < .05$) in social quotient. Findings suggest that early intervention facilitates the acquisition of early developmental skills during childhood.

Aronson and Fallstrom (1:489-94) conducted a study to determine whether the rate of development of eight Down's Syndrome children could be improved by early systematic mental training. Another eight children served as a control group matched for age and sex with the training group. Each child in the training group was trained twice a week for a period of 15 minutes to one hour. The training was based systematically on the normal developmental pattern of children. The following functions were

trained: sensory, natural body functions, mental endowment, motor, memory, emotional, social, and energy. The period lasted nearly 18 months with both groups being tested every six months.

Results again showed that training had a significant effect on the trained children. In all six sub-scales of the Griffiths' test, the training group showed greater progress than the control group, especially for speech, eye-hand coordination and performance.

The purpose of Piper and Pless' study (21:463-8) was to evaluate the mental development of Down's Syndrome infants receiving early intervention. A total of 37 infants under 24 months of age (mean age 9 months) was placed either into an experimental or control group and assessed over a six month period. The intervention program consisted of center based therapy sessions twice a week for one hour. In addition, a set of instructions was given for the parent to follow at home. Emphasis was placed on encouraging childs' acquisition of successive developmental levels.

In sharp contrast though to the other studies the performance of the experimental group was not superior to the control group in any areas of development. Several possible explanations for this discrepancy are offered. A seasonal bias may have been present since development was not assessed for the same six month period for both groups. It is also possible that a longer period of intervention would have produced different results. The age of the child with Down's Syndrome at the time of intervention is also a critical factor. Similarly, the interaction

of amount of treatment with the age of the child may necessitate a different approach for infants than that usually employed with preschool children. In this study also, the researchers did not attempt to assess the effectiveness of training sessions at home between parent and child as a result of expense in time and personnel.

Chapter III: Interplay of Variables

1. Relation of Parent Involvement to Intervention
2. Age as a Critical Factor when Initiating Intervention Programs for the Down's Syndrome Child

The present chapter was designed to emphasize the importance of two variables upon the total effect of intervention and the Down's Syndrome child. While it has been confirmed that stimulation and training is quite beneficial for the Down's Syndrome child in attaining a higher level of development than his counterpart, there is also the matter of: 1) Parent involvement and 2) Age of the Down's Syndrome subject.

Benefits of the intervention program are not limited only to the children, but are most valuable to the family as well. At the 11th Annual Down's Syndrome Congress, (September 1983) Dr. Kochanek (15) presented a lecture on the "Parent Roles in Programs for Infants and Preschool Handicapped Children." He stated that while the intervention programs are very diverse, many concentrate on being family centered. In a study designed to trace the growth and development of Down's Syndrome children as they progressed through the intervention programs 125 questionnaires were distributed to the parents of these children. When the questionnaires were completed and returned (86 total) the following percentages were tabulated in revealing the parents outlook on their involvement and results from intervention programs.

91% indicated they had a better understanding of their child,

86% indicated they had a better sense of the future

92% stated they felt more competent

78% stated they appreciated the opportunities to become involved with other parents. (served as emotional support)

The following studies proceed to focus on the involvement of parents in the intervention program and the positive results attained not just of the child, but of the parents as well. Bidder (2:383-6) hypothesized that training of mothers' with Down's Syndrome children would be beneficial both to the child and parents. The eight mothers in the treatment group received twelve training periods during 6 months. There was also one meeting for the fathers and baby minders. Each session was divided into two parts. The first 1½ hours was spent teaching mothers behavior modification techniques found to be beneficial in training mentally retarded children. In the latter part of each session (45 minutes) a discussion group was held when the mothers expressed and shared their family and personal problems resulting from their Down's Syndrome child.

Mothers were also asked to keep frequent records throughout the six months. These recordings were used to decide whether the mothers techniques needed modification. Results confirmed the original hypothesis that training of mothers with Down's Syndrome children is of benefit to the child by facilitating his developmental progress and to the mother by her gaining more confidence and competence in her daily management of the child. It is also interesting to note that the mothers in the treatment group observed the progress of their child's development intensely.

In her book, Teaching a Down Syndrome Infant: A Guide for Parents, Marci Hanson (35) emphasizes the significance of parents and their effectiveness in teaching their babies skills. Throughout the book all infant teaching was performed by the parents in their homes. Hanson also employed parents in her study (9:403-7) which attempted to keep Down's Syndrome infants development within normal range. (The six parents in the training group were visited weekly or bi-weekly by a parent advisor and a staff member. Following evaluation the parent advisor wrote behavioral, educational programs for the parents to follow on a daily basis (four to five programs a week, ten trials per day for each program). Parents collected data on each trial and utilized this data to determine when to modify or advance through a program.

In addition to the intervention suggesting evidence of the effectiveness of early education the following information was also recorded. By the end of the program, parents were independently assessing their children, establishing goals, writing teaching programs, and modifying and/or advancing through programs based on the data they gathered. The parent advisers' role had now shifted to the role of consultant.

According to MacDonald and co-workers (17:395-415) the inadequate language behaviors of Down's Syndrome children do not result from such constructs as "mental retardation" or "brain damage," but rather from the consequence of inadequate training or the lack of appropriate training. A second major experimental issue in this study was the feasibility of training parents to

serve as successful language trainers with their children. The experimental group included three subjects and their parents. The program was divided into two phases and ran for 5 months. Phase I at the clinic included an orientation meeting with all parents, one training session for the mothers, a seven week training period (sessions twice a week) with the child, and a final transfer-of-training session. Parents were also instructed to conduct at home daily language sessions paralleling those held at the clinic. Phase II which immediately followed Phase I, involved language training sessions in the home at least three times a week with parents as the sole language trainers.

Results revealed that success of parents as language trainers appeared to instill in them a new confidence in their ability to "teach" as well as "raise" their children. At the beginning, each mother showed reluctance to be her child's "teacher." As the program progressed though, the mothers showed increasing confidence and in many cases, real creativity in being language "teachers." In summary, both children and mothers benefitted significantly from the intervention program.

To assess the effect of early intervention Connolly and Russell (5:156-58) conducted a study with 40 Down's Syndrome children and their parents. The staff agreed that the parents should be the primary programmers for their child since the program was to be carved out at home. In addition, the program was oriented to promoting family stability through group experiences for the parents.

During the formal program, the parent and child were seen

in a group session with other parents and trained professionals. The sessions were planned to be informative to the parents, and information was given on motor, sensory, play and social activities, feeding skills, language development and self-help skills. Home programs were continued during the planned clinical sessions. Parent sessions were also conducted weekly by the nurse and social worker as part of the total program. Parents were urged to discuss their problems in dealing with the children, to share concerns and to interact with each other.

In addition to the Down's Syndrome children attaining developmental milestones earlier than the comparison group, effects of the program were also seen in the families after the group experiences. The families showed evidence of improved interfamily relationships and improved adaptation to the handicapped child. Indeed, the parents became the primary programmers of their children.

In her follow-up study five years later Connolly (6:1405-8) stated once again that the early gains provide a springboard for later learning in other settings. Also, parents who may not have made sustained efforts to maximize their child's functioning may have become motivated and engendered by the program. Through participation in these programs, parents seem to achieve a more realistic understanding and acceptance of their child and learn effective teaching techniques that can be applied at home.

According to Stalzberg and Villani (23:403-13) language skills that are limited to the training context provide small

justification for the effort required in their acquisition. If though parents can acquire the necessary skills, and intervention can be conducted in the natural environment, daily intervention time available to learners can be increased, and maintenance of language skills enhanced.

Two mothers and their Down's Syndrome children participated in the experiment. Training sessions were held in a preschool which consisted of vocal imitation trials and observations were recorded in the home. Parents were taught to give appropriate vocal prompts, use praise or a correction procedure following child responses, and reduce the number of tangential statements during vocal-imitation trials. Since parental behavior at home was unchanged after substantial effects had been observed at the preschool, a generalization program was implemented in the school setting in place of the vocal-imitation training.

Results of this study reveal that as intervention agents for their own children, parents can help to achieve meaningful therapeutic effects, maintain therapeutic gains, and promote efficient use of professionals' time. The two mothers readily acquired speech-teaching skills necessary to produce vocal-imitation by their Down's Syndrome children. During the base-line condition in the preschool, parent behavior was character-ized by zero rates of appropriate prompts for imitation, low rates of praise and high rates of distracting, tangenital state-ments. However, after training there was large changes in all categories of parent behavior, accompanied by improvement in childrens behavior. Lastly, intensive instruction helped parents

to learn to adapt their prompting and reinforcement techniques from a discrete trial format to a free-play situation.

According to Ludlow and Allen (16:29-44) for the under-five handicapped child the best speech or physiotherapist is the mother. In addition, the immense satisfaction that the mother derives from being given something specific to do for her handicapped child helps to mitigate the helplessness and hopelessness she feels when first aware that her baby is not normal.

While this study employed three groups, the subjects in Group A consisted of Down's Syndrome children whose parents had received counseling and were attending a Developmental Clinic twice weekly. After assessment an intense program of stimulation in which the mother was fully involved was begun. Mothers were encouraged to keep progress charts at home in order to sharpen their observation and help them appreciate the progress of their child.

In summary, the early intensive pre-school stimulation with parental counseling and full maternal involvement reduced the decline in developmental quotients of Down's Syndrome children and enabled them to more nearly reach their potential. The earliest results of this program was evidenced by the immediate change in the parental attitude. Hopelessness and helplessness were replaced by an optimistic approach and the eager reporting of progress in every stage of development.

Lastly, in an excerpt written in Drash and Stolberg's (8:8) study a report by the American Association for the Advancement of Science stated that "increments gained in IQ and academic

performance by participation in early intervention projects were more durable when parents were integral components of the program." As stated so emphatically by Veras (40:190) parents have great love and strength. They are the best therapists for their children!

Included among the main requisite components for effective early intervention is: commencing the intervention as early as possible in the child's life. In his study Morgan (19:247-9) included 217 children diagnosed as having Down's Syndrome. The subjects ranged in age from 3 months to 15 years. Morgan found that there was a systematic decline in the intellectual and adaptive functioning with increasing age in the Down's Syndrome child. While he does not elaborate on the details of any type of intervention program he does state that tests results also indicate that some of the children clearly functioned at a higher level than others and showed a slower rate of deceleration and a higher point of leveling off in late childhood or adolescence. Emphasis is made on decelerating the rate of decline relative to age and raising the level of functioning in individuals with this syndrome through intervention begun in early "infancy" together with parental training and intensive stimulation.

Clunies-Ross (4:169-77) when studying Down's Syndrome subjects (3 to 37 months old) collated age-related data that indicated that development was accelerated in all three age groups: 0-11 months, 12-23 months, 24 months and over. However, because of the progressive decline in developmental quotient

which occurs prior to intervention it was clearly an advantage for children to enter the early-education project as soon as possible "after birth." Results indicated that younger groups commenced at a higher developmental level and maintained their superiority over 12 months.

The importance of this early start was also stressed by Connolly and Russell (5:156-58) when comparing 40 Down's Syndrome children ranging in age from birth to three years old. The program was based on the concept that infants with potentially delayed development may be favorably influenced through early intensive motor and sensory stimulation. Results indicated the importance of intervention before 6 months of age. In the study, those infants begun after 6 months of age exhibited evidence of delays in most areas. The progress in relation to the chronological age of the infants who were started later in the program was much less than for the infants who were enrolled in the "first few months" of life. Following are developmental milestones and age of subjects when acquired. (A=Begun in program before age 6 months; B=Begun in program after age 6 months). Holds head erect - A=2.7 months; B= 3.0;

Sits unsupported - A=7.2 months; B= 9.1;

Crawling - A=7.8 months; B= 9.3;

Stands (at rail) - A=11.4 months; B=12.2;

Walks with support- A=11.6 months; B=15.6.

In addition, it seems that the previously held belief that the child with Down's Syndrome did not have noticeable developmental delays until six months of age is disputed by these findings.

When Ludlow and Allen (16:29-44) were estimating the effect of early intervention and pre-school stimulus on the development of the Down's Syndrome child three different groups of children were employed. Before the Developmental Clinics were started in Kent it was the poli y for Health Visitors to refer to the C.M.O. any child of two years who, it was suspected might require provision for special education. Following this referral an assessment was carried out. Thus when the Developmental Clinics were started a request was made that every handicapped or retarded child should be referred as soon as a diagnosis was made. In the case of the Down's Syndrome child this was at "birth" or shortly thereafter. The children in Group A then, (those receiving intervention) were assessed earlier than those in Group B which resulted in a significant difference. (x^2 = 10.15, 1 d.f. $P < 0.005$). With the program of stimulation commencing as "early" as possible the widespread belief that the outlook for the Down's Syndrome child is hopeless, can be refuted.

While Piper's study (21:463-8) did not demonstrate benefits for intervention being an effective means of altering the pattern of development with subjects participating in the program, the age of the child at the time of intervention was noted as a critical factor. With the decline of developmental quotients over time, the age of subjects in this study may have had an effect upon the results. It has been found that the greatest decline in developmental quotients takes place between 6 and 10 months of age. Since the mean age of infants in this trial was 9 months it is possible that intervention was initiated at a

time when the natural decrease in intelligence was occurring at a rapid rate.

Brinkworth (3:73-8, 82) showed an advantage of stimulation beginning from "birth" over that beginning only twelve months later. At 1 to 2 years of age the average Developmental quotient's of the early stimulated group was 66.76 compared with 56.87 in the later group. Brinkworth suggested that if assistance of a suitable kind is given "early," the prospects of a successful outcome are markedly improved. Indications are that beyond the 12th month of life, certain irreversible events may have taken place. To the Down's Syndrome child, time then can either be a useful ally or an implacable enemy! (3:78)

Chapter IV: Final Analysis

Limitations of Study:

Overall the studies evaluated and analyzed on the topic of Down's Syndrome and early intervention were quite beneficial. Methods of collecting, reporting and discussing data were all basically clear and very detailed. However, the author upon close examination of procedures and results has found some information and a number of potentially relevant variables that the studies were not limited to.

To be more specific, it was found that of the sixteen studies analyzed only three indicated Karotypic data. "Karotyping is important because misdiagnoses have occurred occasionally in the past and also because of the possibility that intellectual abilities (and possibly other traits) vary among the three forms of Down's Syndrome." (22:441)

While males and females were both employed in many of the studies, sex differences were not emphasized when reporting results. Interestingly, in at least two recent studies, the investigators have found distinct sex differences in psychometrically assessed intelligence in Down's Syndrome children. Only five out of the sixteen studies evaluated indicated the sex of the subjects.

Another limitation concerning most of these studies is the amount of time the subjects were studied. While the time span ranged from 2 weeks to 35 months the question, then, of long-term effects of early intervention is still critical. More follow up studies are needed in order to modify and initiate

the stimulation which is so crucial for the early development of the Down's Syndrome child.

While it was indicated in eight of the studies that parents had an active role in the intervention program this was solely elaborated on for the maternal figure. Explicit details of the paternal figure was not included for any study. Studies dealing with the involvement of the father in the intervention program, as well as the related outcome and his personal attitude would be of interest for means of comparison.

Lastly, the author found that the following variables were not accounted for in the majority of studies. These factors when considered may have an effect on the development of the Down's Syndrome child in relation to the intervention. 1) Age of Parents; 2) Family Size; 3) Position of child in family; 4) Social Class; 5) Race; 6) Motivation of parents.

Conclusions:

As stated so wonderfully by Margaret Marshall at her workshop "Try Another Way': An Innovative Approach to Training" (18) all people respond best to a learning environment which is based on respect of their human worth and capabilities. After reviewing and comparing these studies there are more cases where the experimental group attained higher and more positive results than the control. The hypothesis then "Do children born with Down's Syndrome who receive early active intervention attain a higher level of development than those who do not?" has been proven for the purpose of this study.

In a brief review of the results it was found that early,

intensive, stimulation and training, together with parental involvement and available parental support and guidance was effective in facilitating the Down's Syndrome child to attain a higher level of development than his unstimulated counterpart. No matter what area the intervention focused on; Language Development, Motor Skills and Sensory Integration, Mental Functioning and overall Developmental Milestones results continuously revealed positive and significant differences for those subjects receiving intervention. In her article Thorley states that "evidence indicates that environmental factors such as training and good care at home can improve the rate of development in Down's Syndrome children." (27:8) She continues to state that Down's Syndrome children engaged in behaviors at ages not only earlier than children not involved in an intervention program, but close to normal developmental ages.

To continue, through participation in the programs parents achieved more confidence and competence in daily management, gained a more realistic understanding of their handicapped child, learned effective teaching techniques and in many cases became the primary programmers of their children.

In conclusion, while one study did not find results in favor of early intervention the potential benefits of the majority of studies appear to justify the interest and time devoted to such programs and stress the need for further refinement, assessment and study.

Implications:

"While medical caution may be reasonably based on a fear of

encouraging unjustified hopes, it may be considered that the parent without hope or expectation, little information or guidance is all too likely to deprive his child of the very experiences of love, human contact and stimulation which can assist his development to a higher level." (3:78)

With the 1970's recorded as the decade that early intervention became accepted as an appropriate means of helping potentially handicapped or developmentally delayed infants, toddlers and their families statements to parents need not be so negative as they sometimes are. In mental handicap, a condition which is frequent is often not understood by many people. Support from others is often lacking and embarrassment often leads parents into a self imposed isolation which is disadvantageous both to them and to their child. who, like others needs normal social contacts.

As stated earlier in Chapter I, "children learn through experiences." Their development is not necessarily a result of genetic makeup and talents, but in most cases a reflection of the quality of their environment. Ms. Horstmeir, in her lecture at the Down's Syndrome Congress (13) emphasized two factors that make a difference in the Down's Syndrome child's development, 1) the kind of variety of experiences he/she have; 2) interactions with other people. Given appropriate stimulation and training during the first few years of life, these children are better able to cope with the world around them and are more receptive to the learning process, thus developing more rapidly than has traditionally been believed.

It seems then that if the same principle was applied to the parents or initial caretakers of the Down's Syndrome child intervention programs will continue to focus more on involving the parents, as well as the child. While many of the studies evaluated did incorporate parents into the program a number of them did not have a very active part. From those that did the results were overwhelmingly positive for their involvement and personal attitude. The more experiences a parent is provided in training and teaching methods to engage in with their child the more hopeful their own attitudes will become. Parents need to be supported and guided by professionals in dealing with feelings and concerns they have about their handicapped child. In this sense they will have a more realistic and better understading of Down's Syndrome and feel more competent in raising this "special" child. As a result of the parents having a more positive and optimistic approach so too may the other family members.

As stated in Chapter III Kochanek (15) found that 78% of the parents of Down's Syndrome children interviewed depended upon the professionals, trainers and other parents involved with the intervention program as an opportunity for socialization as well as 81% focusing on it as a means for emotional support. It seems that for the parents, as well as for their Down's Syndrome child intervention should be initiated into their lives as soon as possible so neither is allowed to lie placid, helpless or forgotten. The studies examined have continued to support the original hypothesis. May the methods training and studies

continue to offer the child with Down's Syndrome at least a measure of the justice, which, in the past, he has been unknowingly denied.

Suggestions:

When suggesting ideas for further research the author must emphasize again the need for furtner longitudinal studies to assess the effect of early intervention on the long range development of the Down's Syndrome child. Of special interest is the possible influence of intervention programs on development of language and cognitive skills, areas in which the Down's Syndrome child is most impaired in middle and late childhood. This stresses the necessity for continuous systematic training for the Down's Syndrome child in order to develop to its fullest potential.

Further research could also include and comment on the paternal figure in a role as involved as the maternal parent in dealing with the Down's Syndrome child. In addition it would be interesting to note what implications, if any, the variables such as: family size, position in the family, race or social class would have upon the effects of early intervention and the Down's Syndrome child.

Lastly, research and intervention should continue to focus on those with Down's Syndrome immediately after detection at birth or soon afterwards. As emphasized by Connolly in her study, "Interdisciplinary Early Intervention Program" (5) the previously held belief that the child with Down's Syndrome did not have noticeable developmental delays until 6 months of age

has been disputed by her findings. Through training and stimulation in certain developmental areas the Down's Syndrome child is given opportunities to become more mobile and better adept at partially caring for himself, which in turn makes him better able to cope with the world around him and be more receptive to the learning process.

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